DEPARTMENT OF THE NAVY
ENGINEERING FIELD ACTIVITY, WEST
NAVAL FACILITIES ENGINEERING COMMAND
900 COMMODORE DRIVE
SAN BRUNO, CALIFORNIA 94066-5006

IN REPLY REFER TO:
5090
Ser 18252/7309
23 July 1997

From: Commanding Officer, Engineering Field Activity, West, Naval Facilities Engineering Command
To: Distribution

Subj: RADIOLOGICAL SURVEY, TIDAL AREA LANDFILL NAVAL WEAPONS STATION CONCORD, CALIFORNIA DRAFT SUMMARY REPORT

Encl: (1) Radiological Survey, Tidal Area Landfill Naval Weapons Station Concord, California Draft Summary Report

1. Enclosed is the draft Radiological Survey Report for the Tidal Area Landfill. The information provided in the report will be included in the Draft Final Remedial Investigation Report, Tidal Area Sites 1, 2, 9, and 11, Concord California.

2. Please review and submit any written comments to the Navy within 60 days of receipt of this letter, or 24 September 1997.

3. If there are any questions regarding this correspondence, please contact the undersigned at (415) 244-2769.

Clint Fisher
CLINT. FISHER
By direction

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National Oceanic and Atmospheric Administration (Attn: Laurie Sullivan)
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U.S. Fish and Wildlife Service (Attn: Jim Haas)

Copy to:
NWS Concord (Attn: Richard Pieper) [w/encl]
PRC EMI (Attn: John Bosche)
PRC EMI (Attn: Anju Vig)

PRC Environmental Management, Inc.
135 Main Street
Suite 1800
San Francisco, CA 94105
415-543-4880
Fax 415-543-5480

July 28, 1997

Mr. Clint Fisher
Remedial Project Manager
Engineering Field Activity West
Naval Facilities Engineering Command
900 Commodore Way, Building 206
San Bruno, CA 94066-2402

Sub: Transmittal of Draft Summary Report, Radiological Survey, Tidal Area Landfill
Naval Weapons Station, Concord, California
CLEAN Contract No. N62474-88-D-5086
Contract Task Order No. 0281

Dear Mr. Fisher:

Please find enclosed four copies of the draft summary report for the radiological survey performed at the Tidal Area Landfill under Contract Task Order (CTO) 0281 at Naval Weapons Station (WPNSTA) Concord. Copies of the report have been forwarded to regulatory agencies as per the distribution list.

If you have any questions or comments, please call me at (415) 222-8224.

Sincerely,

Anju Vig
Project Manager

cc: Mr. Roy Santana
File

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To be used only when an identification of enclosures is required or when pertinent comments are necessary.

From	Date
Engineering Field Activity West, Naval Facilities Engineering Command 900 Commodore Drive, San Bruno, CA 94066-5006	23 July 1997
Subject	In Reply Refer To
Radiological Survey, Tidal Area Landfill Naval Weapons Station Concord, California Draft Summary Report	
Reference	

TO: PRC Environmental Management, Inc.
135 Main Street, suite 1800
San Francisco, CA 94105

Attn: Anju Vig

Enclosures/Remarks

Anju,

Enclosed is the cover letter to include when sending the draft report to the Distribution.

When making the distribution, please send 4 additional copies to me for our the EFA internal distribution.

Thanks,

Clint Fisher

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18411

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COMPREHENSIVE LONG-TERM ENVIRONMENTAL ACTION NAVY
CONTRACT Number N62474-88-D-5086
Contract Task Order No. 281

Prepared for

DEPARTMENT OF THE NAVY
Clint Fisher
Remedial Project Manager
Engineering Field Activity West
Naval Facilities Engineering Command
Concord, California

RADIOLOGICAL SURVEY, TIDAL AREA LANDFILL
NAVAL WEAPONS STATION
CONCORD, CALIFORNIA
DRAFT SUMMARY REPORT

July 28, 1997

Prepared By:

PRC ENVIRONMENTAL MANAGEMENT, INC.
135 Main Street, Suite 1800
San Francisco, CA 94105
(415) 543-4880

Anju Vig, Project Manager

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1.0 INTRODUCTION

PRC Environmental Management, Inc. (PRC) received Contract Task Order (CTO) 281 from the Department of the Navy, Engineering Field Activity West (EFA WEST), Naval Engineering Facilities Command, under Comprehensive Long-term Environmental Action Navy (CLEAN) contract number N62474-88-D-5086, to conduct a remedial investigation (RI) for tidal area sites (the Tidal Area) at Naval Weapons Station (WPNSTA) Concord, California. As part of the RI, PRC was directed to perform a radiological survey at Site 1 (the Tidal Area landfill).

The objective of the survey was to determine whether significant quantities of radioactive material are present in the landfill and whether such materials are present above background levels or pose a health and safety concern for workers on site. This summary presents background information about the site, PRC's approach to performing the radiological survey at the Tidal Area landfill, the methodology used, and the survey results.

2.0 SITE BACKGROUND

The Tidal Area landfill, which is one of four sites in the Tidal Area, served as the major disposal area for WPNSTA Concord, and was in use from 1944 to 1979. It covers about 13 acres and reportedly received up to 33,000 tons of waste (IT Corp. 1992). Historical aerial photographs indicate, based on the growth of the landfill outline, that the landfill received the majority of the waste from the mid-1950s to the mid-1970s.

Though WPNSTA Concord was not a radium rework facility and the Tidal Area landfill has no history of disposal of radiological contaminants, the Navy and the regulatory agencies wanted to confirm the absence of such contamination because radiological investigations at other Navy landfill sites have revealed contamination. The Navy decided to move ahead with a radiological survey to confirm that the Tidal Area landfill posed no health and safety hazard to workers on site.

Radium-226 occurs naturally as a radioactive decay daughter of uranium-238. Several naturally occurring radioisotopes are present at WPNSTA Concord. Naturally occurring radiation sources include, but are not limited to, uranium and thorium, their radioactive progeny, as well as radioactive potassium. The soils that make up the islands and tidal areas near WPNSTA Concord consist largely of river gravel, arkosic sands, clays, and silts. The predominant source of naturally occurring radioactive isotopes in these soils is the arkosic sand fraction. These sands contain feldspars, a natural source of elevated potassium-40 and uranium-238 radioactivity. As determined at similar sites, potassium-40 is likely to be a substantial contributor to background gamma radiation in this area (PRC 1994).

3.0 SURVEY METHODOLOGY

The purpose of the radiological survey at the Tidal Area landfill was the identification of increased levels of radioactivity and assessment of near-surface levels of radioactivity. Although some radioactivity was distinguishable from background, this was determined to be an anomaly. This section describes the tasks that were performed during the radiological investigation within the Tidal Area landfill site. A walkover survey was conducted to confirm the absence or presence of radiological contamination at the landfill. As per the work plan (PRC 1996), soil samples were to be collected if increased levels of radiation were detected. However, no anomalies were detected; so no soil samples were collected. All field work was conducted in accordance with PRC's radiation and health and safety program guidelines (PRC 1993a; 1993b). PRC's quality assurance plans were followed throughout the survey process (PRC 1990; 1995b).

3.1 GLOBAL POSITIONING SYSTEM

A Trimble Pro-XR Global Positioning System (GPS) was used in the field. It served two purposes: (1) determine and record the northing and easting (location) data for each point, and (2) store the radiation count reading in correspondence with the location data.

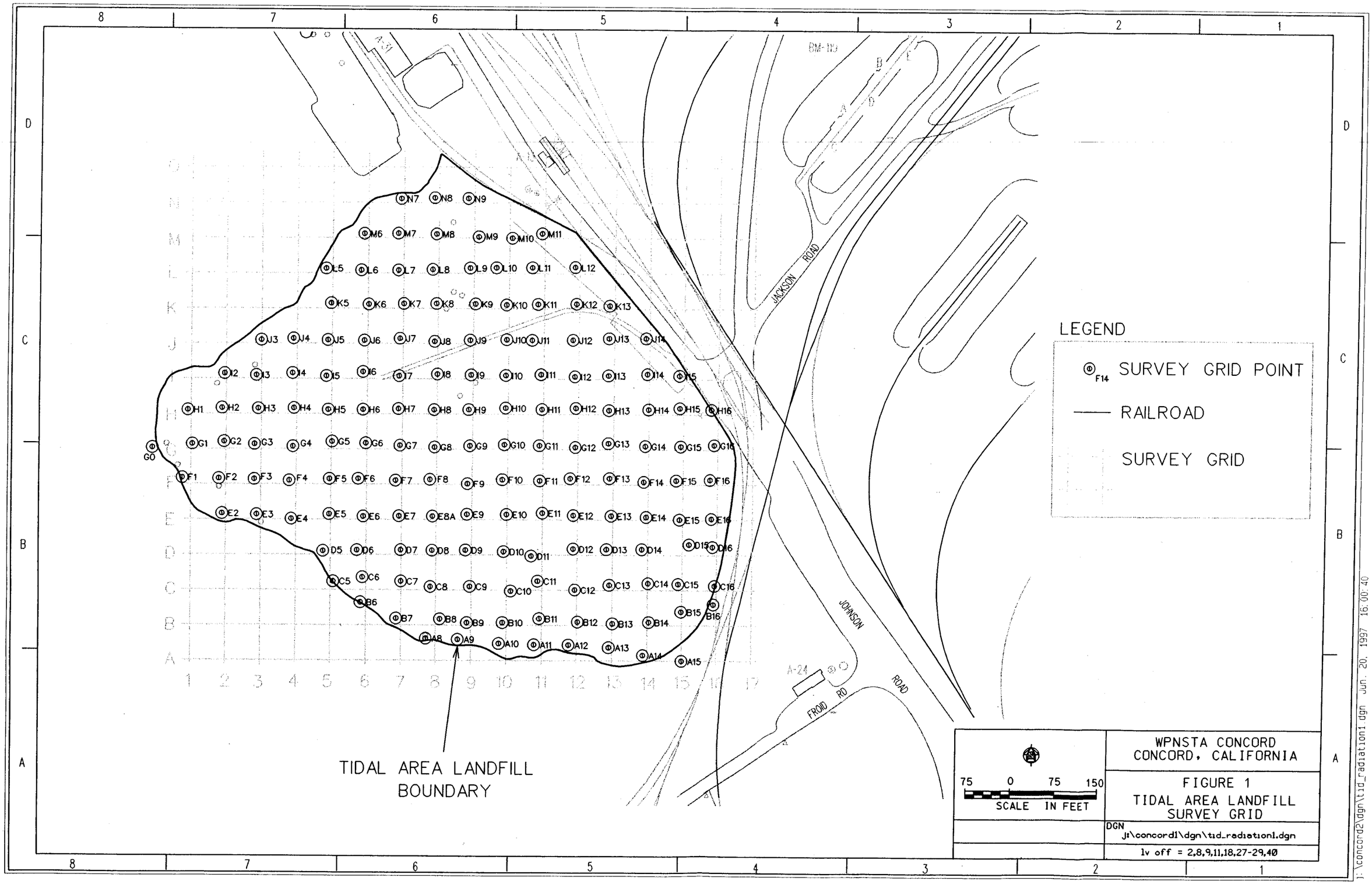
The Trimble Pro-XR GPS system was used to locate grid points in the field because of its sub-meter accuracy. The Pro-XR provides real-time differentiated correction and phase processing for a potential accuracy of 2 feet (Trimble, no date). In order to establish geographic control at WPNSTA Concord, the

GPS was used to locate a known reference point "Control Point Harley." The control point location as determined by the GPS (shown in feet) was northing 566,075.272 and easting 1,559,335.154. Map readings of this location were recorded as northing 566,072.89 and easting 1,559,336.94. These readings were within 2.98 feet of each other. The Trimble Pro-XR was used for recording radiation readings every second as well as for providing 1 minute fixed node counts. The Ludlum Model 2221 rate and scale meter was reconfigured so that it could directly feed radiation data into the Trimble Pro-XR. Northings, eastings, and gamma count levels (counts per minute) were recorded simultaneously into the Trimble Pro-XR every 1 to 3 seconds. Alternatively, by switching the mode, an integrated 1 minute count could also be recorded; this was used to collect fixed node counts.

3.2 WALKOVER SURVEY

The walkover survey was conducted on 60-foot-by-60-foot grid squares using a high-sensitivity, sodium-iodide (NaI) detector (Ludlum Model 44-10) and Ludlum Model 2221 rate and scaler meter, attached to a Trimble Pro-XR GPS. An empirical study was performed earlier at Naval Air Station (NAS) Alameda, California, on similar soils and fill material to test the sensitivity of a 2-inch-by-2-inch NaI detector (PRC 1995a). The test demonstrated the detector's capability to detect a 0.87-microcurie (uCi) radium-226 source at depths as great as 15 inches.

At each of 159 grid nodes on the 13-acre site, a near-surface, integrated, 1-minute count was taken using the 2-inch-by-2-inch NaI detector, rate and scaler meter, and GPS combination. While slowly walking between survey grid points, count rates were monitored using the above combination and exposure rates were monitored using a Ludlum Model 19 (microRoentgen [uR] meter) exposure rate meter (with a 1-inch-by-1-inch NaI detector). The survey grid and the path followed during the walkover survey is shown in Figure 1. The results of the node counts were contoured, and the results are shown in Figure 2. Table 1 lists the gamma counts and exposure rates recorded at each node.


LEGEND
F14 SURVEY GRID POINT
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SURVEY GRID
TIDAL AREA LANDFILL BOUNDARY
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JOHNSON ROAD
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SCALE IN FEET
WPNSTA CONCORD
CONCORD, CALIFORNIA
FIGURE 1
TIDAL AREA LANDFILL
SURVEY GRID
DGN
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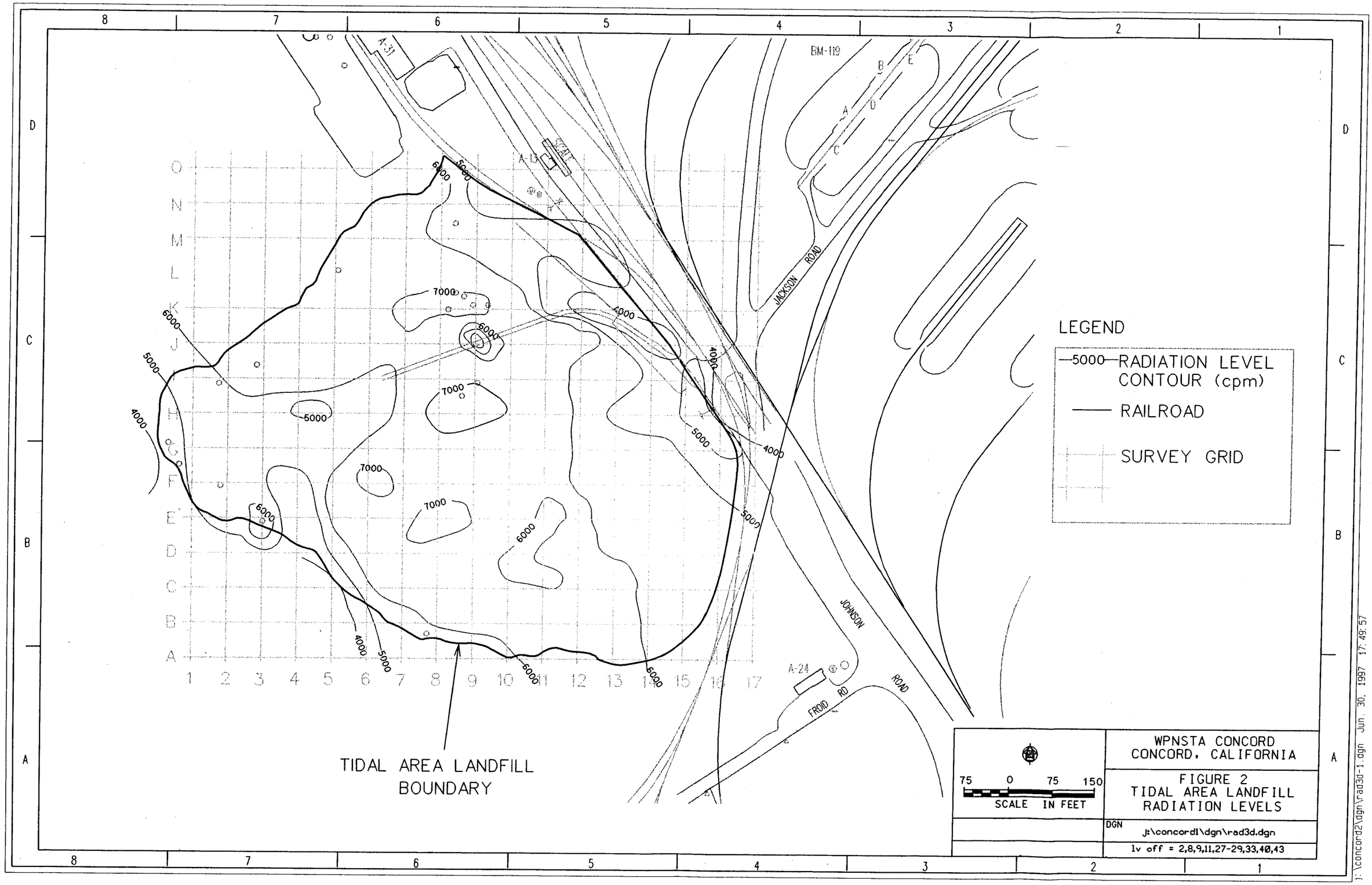
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A-31
A-10
SEAL
BM-119
B
E
A
D
C
JACKSON ROAD
JOHNSON ROAD
FROID RD
A-24
4000
5000
6000
7000
TIDAL AREA LANDFILL
BOUNDARY
LEGEND
5000 RADIATION LEVEL CONTOUR (cpm)
RAILROAD
SURVEY GRID
75 0 75 150
SCALE IN FEET
WPNSTA CONCORD
CONCORD, CALIFORNIA
FIGURE 2
TIDAL AREA LANDFILL
RADIATION LEVELS
DGN
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J:\concord2\dgn\rad3d-1.dgn Jun. 30, 1997 17:49:57

TABLE 1
FIELD SURVEY RESULTS

Node	Gamma Counts (cpm)	Exposure Rate (uR/hr)	Node	Gamma Counts (cpm)	Exposure Rate (uR/hr)
A8	5,867	5-7	D14	5,855	5-7
A9	5,964	5-7	D15	5,859	5-7
A10	6,189	5-6	D16	5,525	5-7
A11	6,149	5-7	E2	5,963	5-7
A12	6,093	5-6	E3	6,302	5-7
A13	6,300	6-8	E4	4,808	5-7
A14	5,834	5-7	E5	6,231	5-7
A15	5,343	5-7	E6	6,808	6-8
B6	5,218	5-7	E7	6,887	6-8
B7	5,879	5-8	E8A	7,627	7-9
B8	6,466	6-8	E9	6,935	6-8
B9	6,447	5-7	E10	7,009	7-9
B10	6,378	6-7	E11	5,948	6-8
B11	6,290	6-8	E12	6,117	6-8
B12	6,574	6-8	E13	5,751	6-8
B13	6,256	6-7	E14	5,470	5-7
B14	5,873	6-7	E15	5,241	5-7
B15	5,679	5-7	E16	5,209	4-7
B16	5,370	5-7	F1	5,629	5-7
C5	3,974	4-6	F2	5,321	5-7
C6	6,235	6-8	F3	5,036	4-6
C7	6,272	6-8	F4	4,537	4-6
C8	6,470	6-8	F5	6,110	5-7
C9	6,744	6-8	F6	7,666	6-8
C10	6,768	7-8	F7	6,713	7-8
C11	5,477	5-7	F8	6,518	7-8
C12	5,923	5-7	F9	6,550	6-8
C13	6,481	6-8	F10	6,875	6-8
C14	5,198	5-7	F11	6,473	6-8
C15	6,331	5-7	F12	5,548	5-8
C16	5,322	5-7	F13	5,814	6-7
D5	5,259	5-7	F14	6,191	5-7
D6	6,080	6-8	F15	5,246	5-7
D7	6,924	6-8	F16	4,480	4-6
D8	6,962	6-8	G0	4,335	4-6
D9	6,833	5-8	G1	6,031	5-7
D10	5,465	5-7	G2	5,362	5-7
D11	6,158	6-8	G3	5,530	6-7
D12	6,135	6-8	G4	5,143	6-7
D13	5,330	5-7	G5	5,812	5-7

Notes:

cpm = counts per minute

uR/hr = microRoentgen per hour

TABLE 1 (Continued)
FIELD SURVEY RESULTS

Node	Gamma Counts (cpm)	Exposure Rate (uR/hr)	Node	Gamma Counts (cpm)	Exposure Rate (uR/hr)
G6	6,505	6-8	I15	5,137	5-7
G7	6,890	6-8	J3	6,186	6-8
G8	6,869	6-9	J4	5,798	6-8
G9	6,721	7-9	J5	6,704	6-8
G10	6,880	6-8	J6	6,701	7-9
G11	7,008	6-9	J7	6,916	6-8
G12	5,672	6-8	J8	6,847	7-10
G13	5,660	5-7	J9	3,630	4-5
G14	5,640	5-7	J10	6,289	7-9
G15	4,309	4-6	J11	6,404	6-8
G16	5,069	5-7	J12	6,493	6-7
H1	5,265	5-7	J13	4,512	4-6
H2	5,137	4-7	J14	3,468	4-6
H3	5,177	5-7	K5	6,782	5-7
H4	4,809	5-7	K6	6,708	6-9
H5	5,265	5-7	K7	7,103	7-11
H6	5,797	5-7	K8	7,160	5-9
H7	6,636	6-8	K9	7,010	6-8
H8	7,151	6-8	K10	6,775	5-8
H9	7,122	5-7	K11	4,824	4-6
H10	6,914	5-7	K12	3,258	3-5
H11	6,713	6-8	K13	4,897	5-7
H12	5,530	5-7	L5	6,568	6-8
H13	4,430	4-6	L6	6,814	6-9
H14	4,489	4-6	L7	6,882	7-10
H15	5,212	4-6	L8	6,381	6-8
H16	3,455	4-6	L9	6,343	5-7
I10	6,685	6-8	L10	5,355	6-8
I2	6,023	5-7	L11	4,389	4-6
I3	6,248	6-8	L12	5,203	5-7
I4	6,180	6-8	M6	6,439	7-9
I5	6,041	6-8	M7	6,847	5-8
I6	5,645	5-8	M8	5,144	6-8
I7	6,315	5-9	M9	5,960	4-6
I8	6,779	6-8	M10	5,471	4-7
I9	6,927	7-9	M11	5,757	5-8
I11	6,296	6-9	N7	6,648	6-8
I12	5,410	5-7	N8	6,057	5-7
I13	5,667	5-8	N9	4,051	4-6
I14	4,788	4-7			

Notes:
cpm = counts per minute
uR/hr = microRoentgen per hour

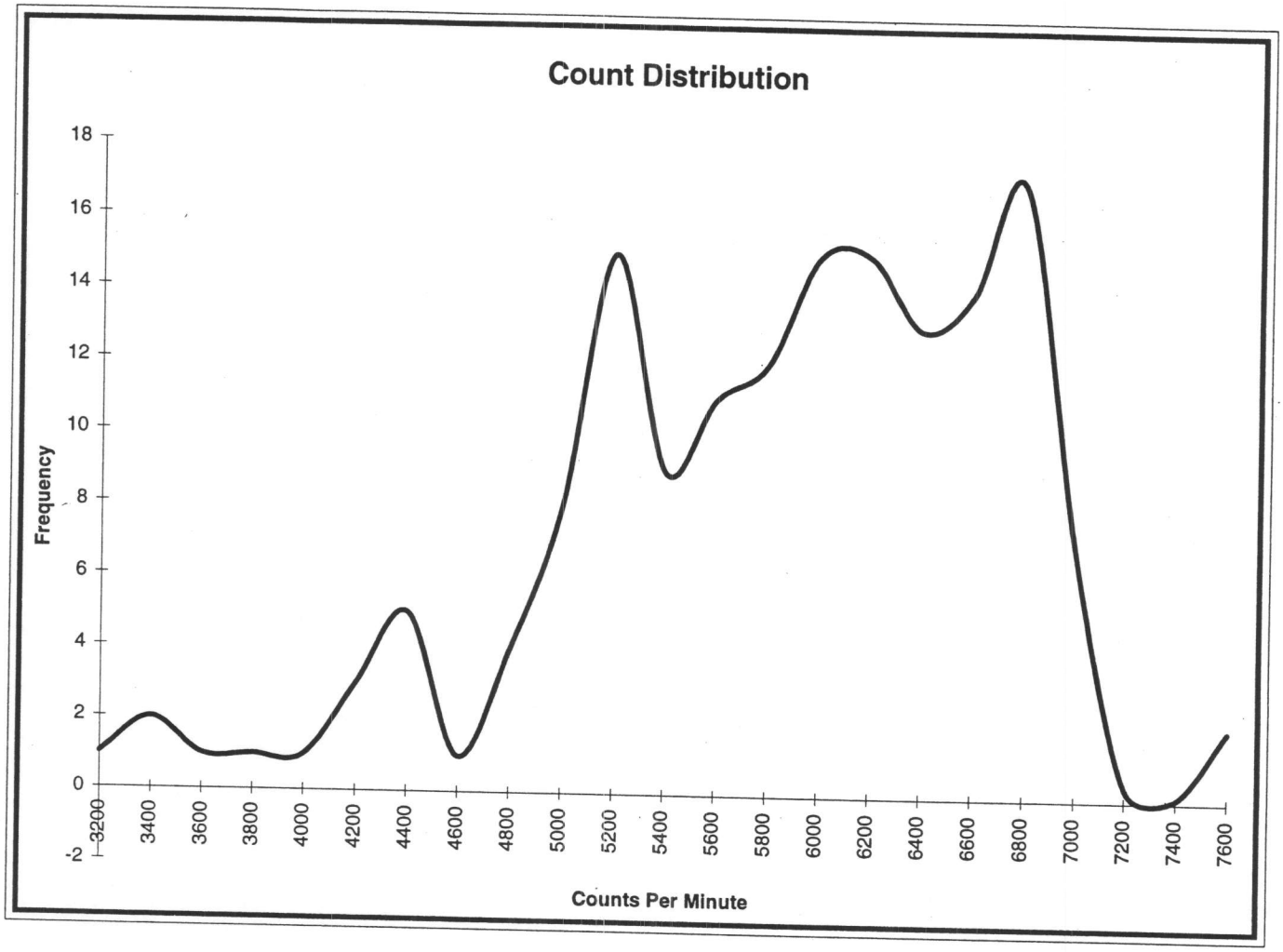
3.3 AMBIENT READINGS

Thirteen 1-minute background readings were collected at various locations within the tidal area, however,outside of the tidal area landfill. The readings ranged from 3,788 to 5,026 counts per minute. Allowing for three standard deviations (about 50%), a reading of 7,539 counts per minute can be considered as background, and this was used as the action level.

4.0 SURVEY RESULTS

The results of the survey did not show any areas of elevated activity. The maximum walkover survey reading was 7,590 counts per minute. The grid node counts ranged from 3,258 to 7,666 counts per minute. The radiation levels at the Tidal Area landfill were contoured using the node count data. The results are shown in Figure 2. A frequency distribution chart of the radiation counts at each grid node (the frequencies were determined for count ranges of 200 counts per minute, i.e., 3200 to 3399, 3400 to 3599, and so on) is shown in Figure 3. A line for the action level of 7,539 counts per minute was drawn on this graph. The two readings (7,627 at E8A and 7,666 at F6) exceeding this value were examined carefully. Though these values exceeded our action level, they were considered statistically normal for a Gaussian distribution.

None of the radiological health and safety criteria identified in the work plan were exceeded. Exposure rates measured as uR/hr did not exceed 10 uR/hr. In addition, no radioactive material (waste) or areas of elevated activity were discovered at the site during the survey.


Count Distribution
Frequency
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16
14
12
10
8
6
4
2
0
-2
3200
3400
3600
3800
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4200
4400
4600
4800
5000
5200
5400
5600
5800
6000
6200
6400
6600
6800
7000
7200
7400
7600
Counts Per Minute

Figure 3

REFERENCES

IT Corp. 1992. "Draft Site Investigation Report, Volume I, Text, and Volume II, Appendices A-F." Prepared for the Hazardous Waste Remedial Action Program, Martin Marietta Energy Systems, Inc., Oak Ridge, Tennessee.

PRC Environmental Management, Inc (PRC). 1990. "CLEAN Quality Assurance Management Plan." January 17.

PRC. 1993a. "CLEAN Ionizing Radiation Protection Program." June 25.

PRC. 1993b. "CLEAN Health and Safety Program Plan." Revision 2. June 25.

PRC. 1994. "Background and Preliminary Site Survey of Naval Communications Station Mill Burner Site, Stockton, California." October 12.

PRC. 1995a. Field notes of the radiological survey of sites 1 and 2 at Naval Air Station Alameda, California.

PRC. 1995b. "Quality Assurance Project Plan, Tidal Area, Naval Weapons Station, Concord, California." February 15.

PRC. 1996. "Draft Work Plan, Tidal Area Landfill Radiological Survey, Naval Weapons Station, Concord, California." December 12.

Trimble. (no date). Trimble Specification Sheet for GPS pathfinder Pro XR.